

APRIL/MAY 2024

GPH32/DPH32 — NUCLEAR PHYSICS

Time : Three hours

Maximum : 75 marks

SECTION A — (10 × 2 = 20 marks)

Answer ALL questions.



1. Write notes on Nuclear angular momentum
2. Specify the importance of nuclear magnetic dipole moment.
3. State Q- equation.
4. Define threshold energy.
5. How Spin-Orbit coupling being held?
6. Give a glimpse on Fermi gas model
7. Write note on Scintillation detectors
8. Give any two examples of mass spectroscopy.
9. Write short note on Higgs particle.
10. What are leptons?

SECTION B — ($5 \times 5 = 25$ marks)

Answer ALL questions.

11. (a) Briefly explain about nuclear electric quadrupole moment.

Or

- (b) Discuss the ground state of deuteron.

12. (a) Explain the Pauli's neutrino hypothesis.

Or

- (b) Deduce Fermi's theory of beta decay.

13. (a) Derive the Semi empirical mass formula.

Or

- (b) Distinguish the Vibrational model and Rotational model.

14. (a) Elucidate about the Geiger-Muller counter.

Or

- (b) Enumerate the construction of the ionization chamber.

15. (a) Discuss about conservation laws of hadrons - and leptons with examples.

Or

- (b) Explain the CPT theorem.

SECTION C — ($3 \times 10 = 30$ marks)

Answer any THREE questions.

Discuss about proton-neutron scattering at low energies.

17. Explain Gamow's theory and selection rules of alpha decay.

18. Discuss shell model and give its important features.

19. Give the applications of Neutron activation analysis and Rutherford backscattering spectrometry.

20. Classify the fundamental forces and elementary particles.

